

Final Year Project

Zeroth Review Presentation



Title

Cellular Automata and Algorithmic Preprocessing to Improve Clustering

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Guide

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Introduction

Clustering is crucial because it determines the intrinsic grouping of the unlabeled data present. For instance, we might be interested in locating homogeneous group representatives (data reduction), identifying unknown properties of natural clusters and describing them as natural data types, identifying appropriate and functional groupings, or identifying unusual data objects (outlier detection)



Scope



Current design challenges

- Finding a proper hash function without losing important data or features
- Lowering the amount of the data by feature reduction, compression, and other techniques
- Choosing an effective algorithm from a list of reversible cellular automata.

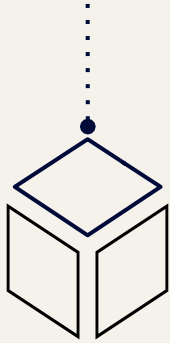
Features

- A non-conventional approach towards clustering, by grouping similar data points based on the rule and cycle formation using cellular automata.
- Utilize cellular automata, we pre-process the data and eliminate any extraneous features from the clustering algorithm.
- Determine the suitable hash functions for entities that need clustering to be positioned in different cells during the initial approach.
- Propose a new algorithm that avoids the randomized search for rules for a particular dataset.
- Package the whole process for ease of replication and development.
- Avoid randomized search will reduce the time taken to cluster and optimize the whole process for any given dataset.

Our process

Phase 1

Replicate the
results of
previous
papers



Phase 2

Preprocess the
data to
increase CA
efficiency



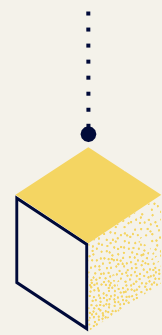
Phase 3

Develop CA
rule search
algorithm



Day 4

Package into
module for
ease of
development





References

- ★ Cycle Based Clustering Using Reversible Cellular Automata
- ★ Clustering Using Cyclic Spaces of Reversible Cellular Automata
- ★ Automatic pattern recognition of ECG signals using entropy-based adaptive dimensionality reduction and clustering
- ★ Reversible Cellular Automata: A Natural Clustering Technique



Thanks!

Do you have any
questions?